Lumbar radiculopathy and synovial cyst in the elderly, with re-imaging following long term conservative intervention: a case report

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ABSTRACT

Objective: To determine the changes to a synovial cyst following symptomatic resolution utilizing a conservative treatment protocol.
Clinical Features: A 76-year- old female had a 6-month history of pain in the right buttock, posterior thigh, calf, ankle and foot and dysaesthesia in the right L5 dermatome.
Intervention and Outcome: Following a short course of conservative chiropractic management, the patient's symptoms resolved and was subsequently discharged. At 6 months post-discharge she remained asymptomatic and was re-imaged using the same MR imaging parameters. Comparison of both sets of images revealed little change in the appearance of the lesion.
Conclusion: MR imaging is the gold standard for radiological diagnosis of lumbar synovial cysts. Surgical intervention remains the most commonly employed management protocol with good outcomes and few deleterious effects. However, there is a growing body of evidence for symptomatic relief using less invasive protocols, including chiropractic (as in this case) and physical therapy. This study was conducted to consider the correlation between symptomatology and radiological findings. This is the first reported case of MR imaging appearances of a lumbar facet synovial cyst pre- and post- successful conservative management resulting in symptomatic resolution.

KEYWORDS**:** Chiropractic, Facet Cyst, Juxta-Articular Cyst, Ganglion Cyst, Lumbar Disc, Intervertebral Disc. [Chiropr J Australia 2016;44(2):164-175]

INTRODUCTION

Spinal synovial cysts are uncommon intraspinal, extradural soft tissue lesions located along the medial border of a degenerated facet that usually demonstrates direct communication with the corresponding joint capsule (1,2). They occur most commonly in patients over the age of 50 years with an incidence of 0.6 – 2%, being found most commonly in the lumbar spine (90%) (3-5). Of those found in the lumbar spine, 60% occur at the L4/5 level, the site of greatest mobility (2,6,7). Most synovial cysts present clinically with low back pain, radiculopathy and sensori-motor deficit due to neurogenic claudication (3,8); however, they may be asymptomatic. The lesions contain a clear or xanthochromic fluid with a thick wall containing granulation tissue, histiocytes and giant cells, and always have a synovial-like epithelial lining (2,9,10). Whilst the exact aetiology and pathogenesis remains controversial, the literature centres around a chronic degenerative process, although some reports have postulated a traumatic predisposition and segmental instability is receiving growing support 11-13). Degenerative spondylolisthesis is observed in 38% - 75% of cases (4,14).

CASE REPORT

A 76-year-old retired female complained of a 6-month history of insidious right-sided buttock

pain and dysaesthesia radiating to her posterior thigh, leg, ankle and dorsum of the foot. Pain severity was reported as 8 /10 on a visual analogue scale. Symptoms were aggravated by standing and walking, and relieved by sitting. Bladder and bowel function were normal and no constitutional signs or symptoms were identified. Physical examination revealed mild sensory deficit in the right L5 dermatome. Lower limb deep tendon reflexes and myotomes were normal and symmetric. Although she reported a 20-year history of occasional episodes of localised low back pain, she had not sought treatment. Based on the clinical presentation, magnetic resonance (MR) imaging of the lumbar spine was obtained, (Fig 1).

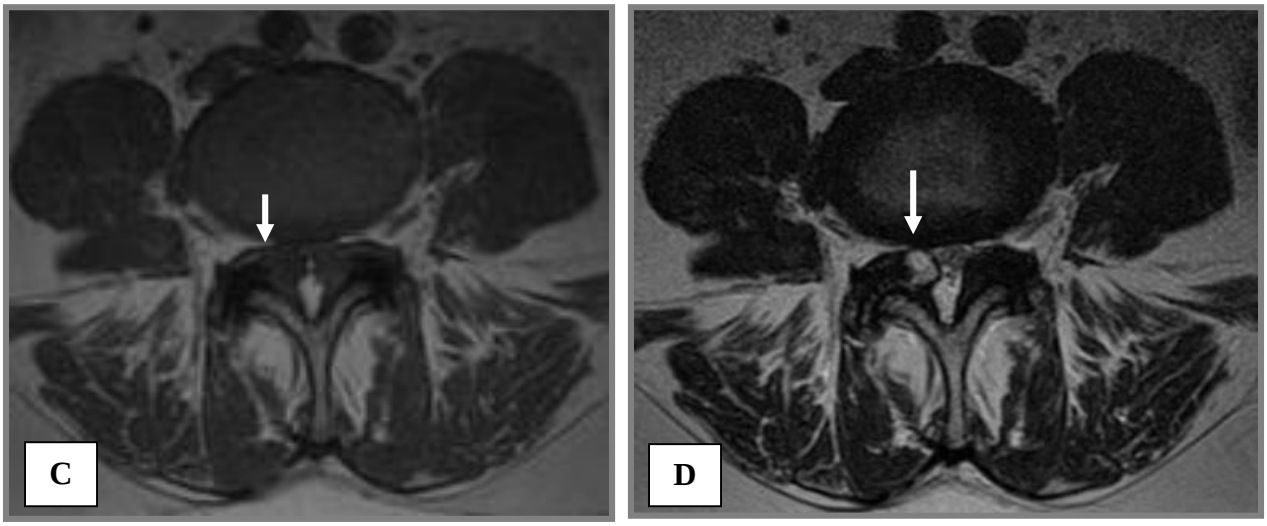

Figure 1: *Right para-sagittal (A&B) and axial (C&D) T1 and T2 weighted fast spin echo sequences of the lumbar spine. A well-defined, cystic lesion iso-intense to CSF is observed communicating with the right L4/5 facet joint, demonstrating a peripheral low signal intensity, significantly displacing the thecal sac and right L5 nerve root. Associated facet joint degenerative change is observed.*

Imaging Findings

Axial and sagittal T1 and T2 weighted fast spin echo sequences of the lumbar spine were obtained and revealed the following:

L4/5: An intra-spinal, extra-dural cystic lesion returning high signal intensity on T2 and low signal intensity on T1 weighted sequences, iso-intense to CSF with internal irregular areas of low signal, (probably representing calcification or haemosiderin deposits). The lesion is well circumscribed with a hypo-intense peripheral margin on both T1 and T2 weighted sequences. Located adjacent to, and communicating with the right L4/5 facet joint, it results in significant foraminal and central canal stenosis displacing the thecal sac and touching the right L5 nerve root. The corresponding L4/5 intervertebral disc returned normal signal intensity without evidence of degeneration. The facet joints bilaterally demonstrate moderate hypertrophy and degeneration and the contra-lateral ligamentum flavum measured 6mm at its maximal transverse diameter suggesting buckling and hypertrophy. Moderate fatty infiltration of the paraspinal musculature is observed.

Treatment and Follow-Up

The patient was treated conservatively with multi-modal chiropractic care, consisting of flexion-distraction therapy, high-velocity low-amplitude (HVLA) thrusts using drop mechanisms, and soft tissue work. Complete resolution of symptoms was obtained after a short course of treatment and monthly, functional supportive care was provided for a further 4

visits before discharge. At 6 months post-discharge, the patient remained asymptomatic. At this point she was re-imaged to determine the status of the original radiological findings, (Fig 2).

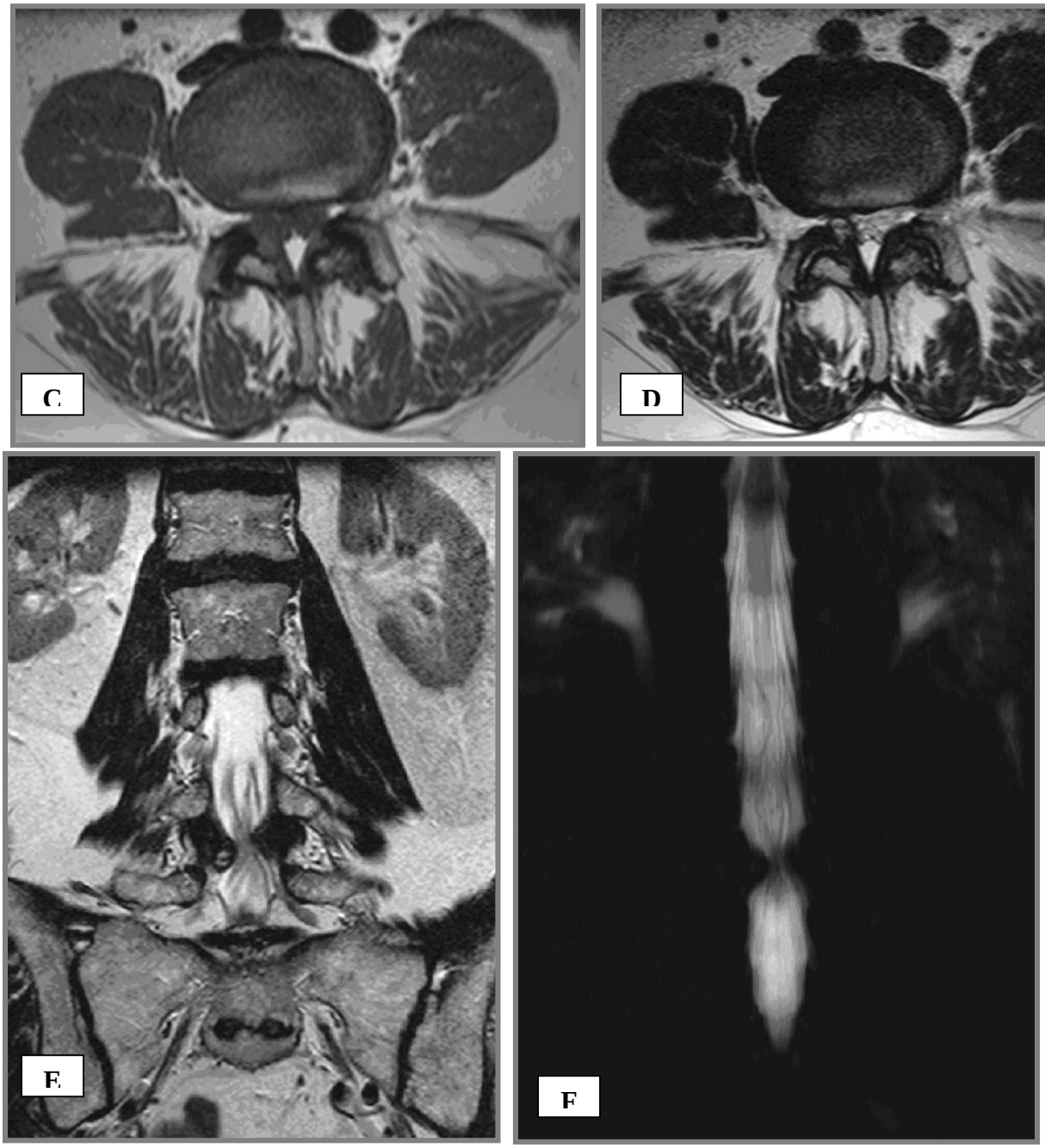

Figure 2: *Right para-sagittal, (A&B) axial (C&D) T1 and T2 weighted fast spin echo sequences, coronal T2 and myelogram (E&F) of the lumbar spine. A well-defined, cystic lesion iso-intense to CSF is observed communicating with the right L4/5 facet joint, demonstrating a peripheral low signal intensity, compressing the right side of the theca giving rise to right sided lateral recess stenosis. Associated left ligamentum flavum hypertrophy and bilateral facet joint degenerative change is observed and the degree of central canal stenosis is best seen on the coronal (E) and myelographic (F) images.*

Imaging Findings

Axial and sagittal T1 and T2 weighted fast spin echo, coronal T2 and myelographic sequences of the lumbar spine were obtained which revealed the following:

L4/5: Imaging features of the location, size, shape and volume of the cyst remain relatively constant when measured digitally, although there may be slight thickening of the synovial membrane in comparison with previous imaging. The degree of lateral recess stenosis and degenerative facet changes are consistent with those in Fig 1. The intervertebral disc and adjacent vertebral bodies have not changed in their appearance, nor the degree of para-spinal fat infiltration.

Direct comparison of the series MR images demonstrates little difference in the gross morphological appearance, (Fig 3).

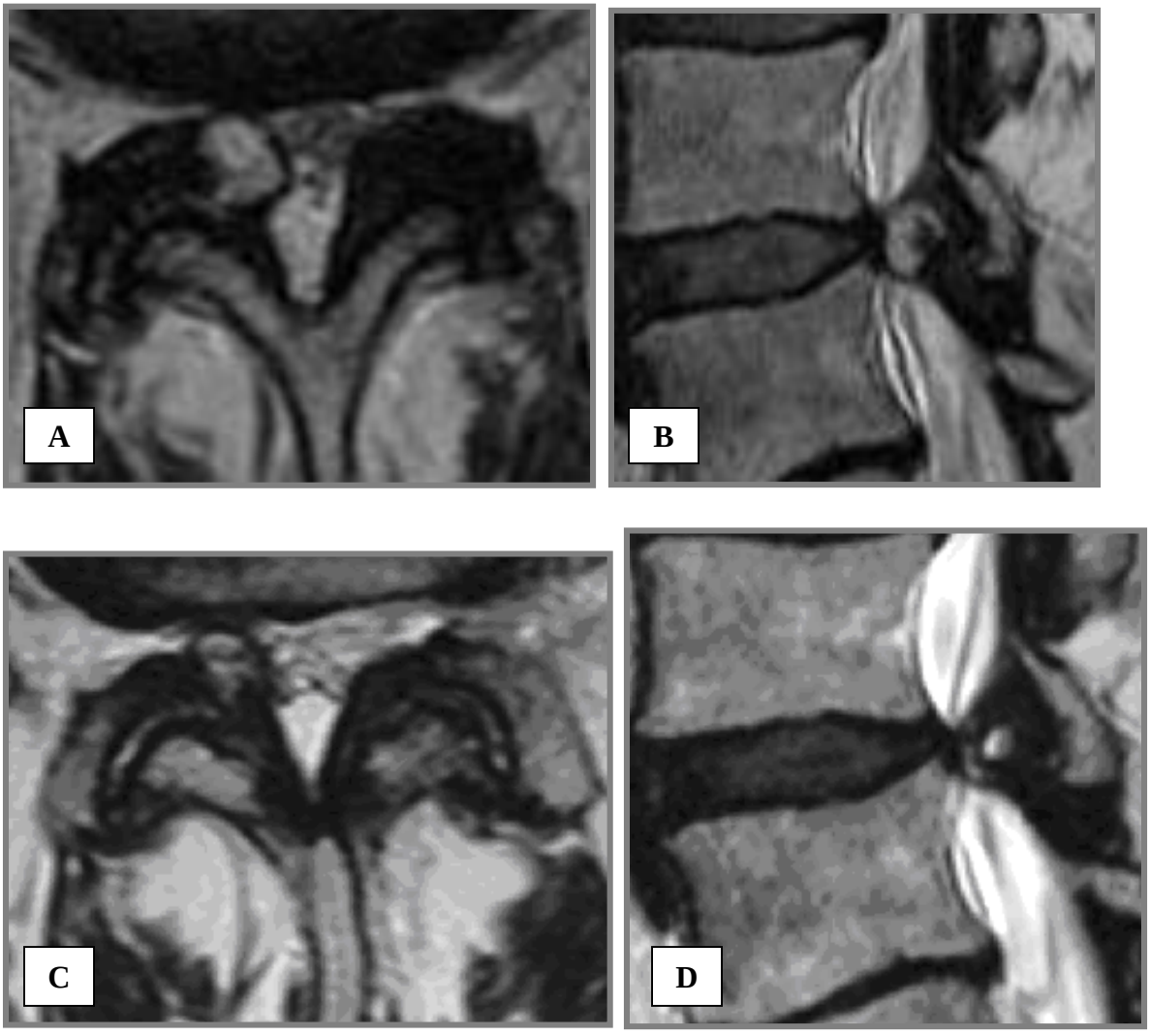

Figure 3: *Initial (A&B) and follow-up (C&D) axial and sagittal focused T2 weighted sequences*

of the lesion are presented for comparison.

DISCUSSION

Imaging Features

Magnetic resonance (MR) imaging is the diagnostic gold standard and typically reveals a round, cystic lesion iso-intense to CSF on T1 and T2 -weighted sequences, in communication with the facet joint capsule (3). It is often indistinguishable from the ligamentum flavum and may displace the theca antero-medially. The associated facet joint usually demonstrates degenerative change.

A hypo-intense margin on T1 and T2 -weighted sequences reflects the fibrous capsule and in chronic cases, calcification within the wall of the cyst. Haemosiderin may also add to the low signal rim in haemorrhagic cases (2,15). Rim enhancement is a feature observed in gadolinium contrast studies[3,12]. Variability in the MR imaging appearance may result from areas of calcification, recent or old haemorrhage, and air within the cyst. Central heterogeneity may occur due to recurrent haemorrhage and irregular T1-weighted hyper-intensity could suggest sub-acute haemorrhage, which may aggravate clinical symptoms (16).

Computed tomographic appearance reflects that seen in MR imaging, including a soft tissue mass adjacent to a degenerated apophyseal joint, often with thecal displacement. The cyst capsule is noticeably denser than the predominantly fluid content. Calcification within the capsule is observed in 75% of cases (7). Gas may also be observed with computed tomography (CT) as areas of very low attenuation within the cyst. CT may also identify pressure erosion of the adjacent neural arch.

Differential Diagnosis

The primary differential diagnosis for synovial cyst is a ganglion cyst. Whilst the clinical symptoms, management and radiologic appearances are very similar, the latter does not demonstrate peripheral low signal due to a lack of synovial lining as seen in synovial cysts (3,4). Ganglion cysts are mucin filled and contain myxoid material without direct communication with the adjacent joint (9). Ganglion and synovial cysts are considered to have similar pathogenesis and aetiology, whilst some authors believe that any distinction between the two is futile as they merely represent two endpoints on a histologic continuum (2,4).

Other possible conditions that might be considered in the differential diagnoses include sequestered intervertebral disc fragments. However these demonstrate a more homogenous low signal on all sequences and more commonly lie anterior to ligamentum flavum[3]. Additionally, adjacent facet degeneration is not a common feature. Sequestered fragments may demonstrate peripheral enhancement on contrast MR imaging due to marginal granulation tissue.

Arachnoid cysts are a rare cause of cord compression and have similar MR imaging

characteristics to synovial cysts; however, these are more common in a younger population (17). A distinct preponderance for the thoracic spine has been demonstrated and communication with the subarachnoid space can be found (3,9).

Haemorrhage and Rupture

Haemorrhage, while rare, may lead to an increase in volume of synovial cysts, leading to neurologic deficits and exacerbating painful symptoms which can require emergency surgery (2). Haemorrhage may result from the rupture of neo-angiogenic vessels formed as a result of inflammatory reactions within the cyst (2).

Spontaneous rupture of synovial cysts can occur, which may result in resolution of symptoms, recurrence of the cyst, progressive neurologic deficit or cauda equina syndrome, or rarely epidural haematoma (18-20). Epidural haematoma may result from haemorrhagic rupture causing acute or chronic cauda equina compression (21).

Treatment

Surgical intervention aimed at complete excision is the most commonly selected treatment for symptomatic lumbar synovial cysts (4,22). Such intervention includes decompressive laminectomies, hemilaminectomies or laminotomies with or without fusion (8,9). Recently, microscopic guided tubular retraction systems have been employed to minimise soft tissue trauma, scar size, blood loss and disruption of ligamentous and osseous structures (22).

Surgical outcomes are generally good, although local recurrence may occur (4,13). Complications are rare (0 – 1.6%) but include dural tear, spinal nerve injury, epidural haematoma, seroma, cyst recurrence and deep vein thrombosis (4).

Non-surgical treatment appears to be a safe and viable option and includes rest, chiropractic management, physical therapy, acupuncture, analgesics, bracing and lumbar injections (4,6,10,14). Chiropractic care consisting predominantly of a combination of flexion-distraction therapy and stabilization exercises maybe effective in treating symptoms relating to synovial cysts (6,14). Further research is required to establish a greater body of evidence surrounding the efficacy of chiropractic management for synovial cysts.

In this case, chiropractic management resulted in consistent symptomatic relief with return to normal activities of daily living. The follow-up imaging (Fig 2 above) identifies a lack of change to the physical appearance of the lesion and raises several questions regarding the symptomatic relationship to the mere presence of the lesion.

CONCLUSION

This case report shows that although symptomatic resolution occurred following conservative care, the synovial cyst may not have resolved. This leaves open the question concerning the mechanism of symptom generation in these cases.

MR imaging is the gold standard for radiologic diagnosis lumbar synovial cysts and other causes of radiculopathy. Surgical intervention has good outcomes and few deleterious effects. Although this remains the most commonly employed management protocol, there is a growing body of evidence for symptomatic relief using less invasive protocols, including chiropractic (as in this case) and physical therapy. However, further research is required to establish efficacy for these treatment options. Primary care physician's trialing a course of conservative management for lumbar synovial cysts should remain astute as to the possibility of complications including haemorrhage, rupture and epidural haematoma which may lead to cauda equina compression and in some cases referral for emergency surgical intervention.

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